For discussion
on 14 March 2017

Legislative Council Panel on Security

Replacement of the Mobilising and Communications System
of the Fire Services Department

PURPOSE

This paper seeks Members' support for the proposal of replacing the Third Generation Mobilising System ("TGMS") of the Fire Services Department ("FSD") to improve the mobilisation of fire and ambulance resources for firefighting and rescue operations.

BACKGROUND

Fire Services Communications Centre

2. FSD is responsible for firefighting and rescue on land and at sea and providing emergency ambulance services for sick and injured persons. The Fire Services Communications Centre ("FSCC") performs all emergency call-taking, mobilisation, as well as command and control activities. The Centre is connected to all fire stations, ambulance depots, fire appliances, ambulances, fireboats, public utility companies and other government departments through direct telephone lines and system interfaces.

3. When an emergency call is received, the FSCC, through a mobilising and communications system, deploys an optimal set of fire and ambulance resources to the scene of incidents for firefighting and rescue operations. It also handles telephone enquiries on fire protection matters and complaints in relation to fire hazards.

Third Generation Mobilising System

4. The mobilising and communications system currently used at the FSCC, the TGMS, was fully commissioned in 2007. The TGMS utilises various information and communications technologies, such as geographic information

and positioning technologies[1], for identification of suitable resources for dispatch; a computer telephony system for the handling of incoming calls; and an automatic call-out system using text-to-speech for automated mobilisation of resources at fire stations and ambulance depots. The TGMS also provides on-scene personnel with incident and operational information in electronic format, which can be accessed through a Mobile Data Terminal installed on every fire appliance, ambulance and fireboat. The TGMS has a design serviceable life of ten years and is extendable to 15 years.

JUSTIFICATIONS

Need for replacing the TGMS

5.   The TGMS will reach the end of its extended serviceable life in 2022. FSD commissioned a consultancy study in 2014 ("the Study") on the options for the future mobilising and communications services to cope with the growing complexity of emergency incidents and the projected increase in the number of emergency calls over the next 15 years, for instance through enhancing or replacing the TGMS.

6.   The Study concluded that, taking into account the technical risk, cost and efficiency of the use of resources, further extending the serviceable life of the TGMS to meet the demand for emergency services for the next 15 years is impracticable. The Study recommended a total replacement of the TGMS for the following reasons:

(a)   **Maintenance problems**: Certain core hardware and software components of the TGMS are becoming obsolete or approaching the end of their serviceable life. Meanwhile, the maintenance of these hardware components largely rely on spare part inventories, as most of their manufacturers have already discontinued support in relation to the production, stock and maintenance of such. These spare parts and obsolete software will likely be unable to sustain the TGMS's maintenance beyond 2022; and

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[1]   Geographic information includes information and data such as map, road networks including traffic direction, harbour plans (e.g. location of buoys), and address attributes including the occupancy of the premises (e.g. hospitals, elderly homes, dangerous good stores). Positioning technologies are used to pinpoint the location of emergency vehicles and vessels via on-board equipment such as digital compass, global navigation satellite system equipment, map matching, etc.

(b)   **Partial replacement or upgrading not feasible**: The TGMS is a highly integrated and custom-made system for FSD's emergency resource mobilisation. Its effective performance is underpinned by multiple sub-systems working interactively and simultaneously for data and information exchange. Any partial replacement or upgrading of the TGMS could inevitably affect the functionality and reliability of the system as a whole. This might result in delays in the mobilisation and dispatch of resources, impairing the delivery of emergency services. A partial replacement or upgrading of the TGMS is therefore considered infeasible.

Proposed Fourth Generation Mobilising System

7.   Having regard to the Study's recommendations and the demand for emergency services that is anticipated to rise continuously, FSD plans to develop the Fourth Generation Mobilising System ("4GMS") to replace the TGMS. The major enhancements include –

(a)   **Improved operational and geographical resilience** – The operational and geographical resilience of the new mobilising and communications system will better meet the international standards on emergency management. For example, the National Fire Protection Association ("NFPA")[2] Standard 1221 recommends that an alternate communications centre shall be separated geographically from the primary communications centre at a distance that ensures continuity of services in case of emergency. The Resilience Guidelines for Providers of Critical National Telecommunications Infrastructure promulgated by the Electronic Communications Resilience and Response Group ("EC-RRG") of the UK[3] also states that wherever reasonable, essential equipment should not be concentrated, particularly in one building, to the extent that overall network security is jeopardised.

In the case of the existing TGMS, both the primary and fallback sites of the FSCC as well as data centres of the TGMS are located on

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[2]   Established in 1896, NFPA is a global non-profit organisation, widely recognised for promoting codes and standards designed to minimise the risk and effects of fire by establishing criteria for building, processing, design, service, installation around the world.

[3]   The EC-RRG is established to ensure the availability of electronic communications infrastructure for the UK and to provide an industry emergency response capability through the ownership and maintenance of the UK National Emergency Plan for Telecommunications.

different floors of the same building, rendering the TGMS vulnerable to single point of failure such as major fires, structural collapse, prolonged electricity outage, leakage of gas or terrorist attacks. An accident impacting the building would adversely affect both the primary and fallback sites of the FSCC. Such risks to the mission-critical mobilising and communications operations should be avoided.

Under the proposed 4GMS, two active FSCCs will be established in two geographically separated sites, one in Kowloon and the other in the New Territories. Each will be responsible for the mobilising and communications operations for incidents in different regions, one primarily for incidents in Hong Kong Island (including outlying islands) and Kowloon, the other primarily for incidents in the New Territories. In the unfortunate event that one FSCC fails, the other FSCC will have the capability and capacity to immediately take over and handle incidents of the entire territory of Hong Kong, thereby enhancing the resilience of FSD's mobilising and communications operations;

(b) **Better handling of complex and major incident and more efficient mobilisation of resources** – To enhance support for FSCC operators and on-scene operational personnel in handling complex and major incidents, the proposed 4GMS can perform the following functions –

(i) The new system will provide an electronic means for real-time monitoring and tracking of incident-related tasks as well as resources allocated to the incidents. For example, an incident checklist will be automatically generated to assist FSCC operators in monitoring the progress of outstanding, on-going and completed actions;

(ii) The new system will allow instantaneous transmission of information to FSCC operators, on-scene operational personnel as well as the departmental management, providing a comprehensive overview of the operations, supplemented with multimedia data, such as geographic information and videos capturing the incident scenes received from the public or other means;

(iii)   While the existing TGMS is able to identify the location of a fixed-line caller, we will explore the feasibility for the 4GMS to be able to identify a mobile phone caller's location, e.g. in a remote place without significant landmarks. This is also in line with one of the recommendations made by the Audit Commission in its Report No. 67 published in October 2016; and

(iv)   Through a more accurate identification of the location of an incident, a precise tracking of resources deployment as well as utilisation of real-time traffic information in identifying the fastest route to an incident scene, the proposed 4GMS is also expected to increase the speed and efficiency with which responding resources are deployed; and

(c)   **Better data for future service improvement** – The proposed system will be able to provide analysis of historical and real-time incident and operational data collected by the system over time. Such analysis will enable FSD to gain better insights into the future demand for its emergency services. For example, the automated analysis of historical incidents, building characteristics and fire safety records would facilitate FSD to better prioritise fire safety inspections of high-risk buildings and channel FSD's fire protection efforts to those most in need.

Furthermore, analysis of mobilising and communications data including call-taking, incident response and resource coverage etc., will enable the department to review its strategy from time to time and react promptly to areas in need, such as through redeployment of resources, as and when necessary.

8.   At the initial stage when the 4GMS is commissioned, the existing TGMS will run in parallel until the new system is robustly and thoroughly tested to maintain uninterrupted service to public and to achieve a smooth and secure transition.

FINANCIAL IMPLICATIONS

Non-recurrent expenditure

9.　　　FSD plans to implement the above proposal over six financial years (from 2017-18 to 2022-23). The estimated non-recurrent cost of the project is around $1,713.7 million. The detailed breakdown is as follows –

		2017-18 $ '000	2018-19 $ '000	2019-20 $ '000	2020-21 $ '000	2021-22 $ '000	2022-23 $ '000	Total $ '000
(a)	Hardware	-	118,288	118,288	177,432	118,288	59,144	591,440
(b)	Software	-	35,139	35,139	52,708	35,139	17,569	175,694
(c)	System Analysis & Design, System Installation and Implementation Services	-	98,769	98,769	148,153	98,769	49,384	493,844
(d)	Site Preparation	-	55,818	83,727	83,727	27,830	27,909	279,011
(e)	Miscellaneous	-	-	350	1,100	7,100	-	8,550
(f)	Contingency (approximately 10% of (a) to (e) above)	-	30,793	33,619	46,303	28,706	15,394	154,815
(g)	Contract Staff Cost for Project Implementation	896	2,249	2,323	2,400	2,478	-	10,346
	Total	**896**	**341,056**	**372,215**	**511,823**	**318,310**	**169,400**	**1,713,700**

Other non-recurrent expenditure

10.　　　The proposed implementation of the 4GMS will require a project team for project management, system analysis and design, site preparation, user acceptance tests, implementation support and system commissioning, etc. This will entail an initial annual non-recurrent staff cost of around $4.2 million from 2017-18 to 2021-22. FSD will review the staffing requirement as the project progresses.

Recurrent expenditure

11.   The proposal will entail an indicative additional annual recurrent expenditure of $68.3 million in 2021-22, increasing to $145.3 million from 2023-24 and onwards to cover the costs of system maintenance and support, network facilities rental, consumables, licences and subscription, building services maintenance etc. FSD will review the staffing requirement to implement the proposed 4GMS nearer the time the system is commissioned.

IMPLEMENTATION SCHEDULE

12.   Subject to Members' comments on the proposal, we plan to seek funding approval from the Finance Committee as soon as possible. Assuming that funding approval from the Finance Committee could be secured within this legislative session, a tentative implementation timetable is as follows –

	Activity	Target completion date
(a)	Preparation of tender specifications	August 2017
(b)	Tendering and award of contract	March 2018
(c)	System analysis, design and development; site preparation and building services works; system installation	February 2021
(d)	System testing and training	April 2021
(e)	System trial run, nursing and acceptance	March 2022
(f)	System full commissioning	April 2022

ADVICE SOUGHT

13.   Members are invited to comment on the above proposal. Subject to Members' views, we will seek funding approval from the Finance Committee.

Security Bureau
Fire Services Department
March 2017